

ALAMEDA COUNTY WATER DISTRICT

SOUTHWEST NILES CONE MONITORING WELLS PROJECT

2005 PROJECT WORK PLAN

The project will drill and construct eight groundwater monitoring wells which will enable Alameda County Water District (ACWD) to obtain detailed geologic and hydrogeologic data of the area, and will provide long term monitoring points to evaluate groundwater flow and quality. Eight wells are proposed at two sites, with four monitoring wells in a cluster at each site.

At each monitoring well cluster site, a single boring will be drilled to 800 feet below ground surface. Samples will be collected every five feet from the drill cuttings by a registered geologist and the boring will be geophysically logged for the purpose of creating a detailed geologic record for the site. Upon completion of drilling and logging of the exploratory boring, a monitoring well will be completed in the Deep Aquifer at a depth of approximately 500 feet. Three additional monitoring wells will be installed at depths dictated by the detailed geologic log created from the 800 foot exploratory boring. These monitoring wells are expected to be installed at depths of approximately 150, 300, and 400 feet below ground surface. The depths of these wells correspond to the Newark, Centerville, and Fremont Aquifers. These aquifers along with the Deep Aquifer, have been encountered in other areas of the Niles Cone, but have not been well characterized in the southwest portion of the basin.

During previous phases of monitoring well construction, ACWD has relied on the Class 6 Categorical Exemption of the California Environmental Quality Act (CEQA). Section 15306 of the CEQA Guidelines describes the following exemption:

Class 6 consists of basic data collection, research, experimental management, and resource evaluation activities that do not result in a serious or major disturbance to an environmental resource.

ACWD will prepare any required documentation necessary to comply with CEQA.

Depending on the final site selection for the monitoring wells, the property owner will either be Alameda County Flood Control District or the U.S. Fish and Wildlife Service. ACWD has established a long and good working relationship with the Alameda County Flood Control District. ACWD has installed and is presently maintaining groundwater monitoring wells in Alameda County Flood Control District easements and obtaining encroachment permits is a straightforward process consisting of completing a simple application form and submitting the form for approval. ACWD has also developed a working relationship with the U.S. Fish and Wildlife Service through the South Bay Salt Pond Restoration Project. The U.S. Fish and Wildlife Service have already been contacted regarding this project and have indicated a willingness to issue a Special Use Permit.

ACWD administers the Well Ordinance program and will be able to internally coordinate the required well drilling permits and inspection activities.

Construction of the eight groundwater monitoring wells are divided into four tasks. The four tasks are: 1) Pre-Construction Activities; 2) Drilling, Well Construction, and Development; 3) Analytical Testing and Evaluation; and 4) Reporting. A detailed description of the work items to be performed for each task is presented below:

Task 1: Pre-Construction Activities

Prior to conducting field activities, ACWD will finalize well locations, secure a drilling

contractor, and complete permit processing. Each subtask is described below:

1.1) Finalize Well Locations

The locations identified in this proposal are the general locations for the drilling sites. These sites were chosen based on their locations near Department of Water Resources (DWR) nested monitoring wells that will soon be destroyed and inferred major depositional channels. The properties where the proposed well sites will be located are within the Alameda County Flood Control District easement or within property owned by the U.S. Fish and Wildlife Service. ACWD will work with the Alameda County Flood Control District and/or the U.S. Fish and Wildlife Service to determine where monitoring wells can be installed and accessible for the long-term, and to secure the appropriate encroachment permits or Special Use Permit.

1.2) Public Notice and Drilling Contractor Selection

ACWD will prepare contract specifications for the proposed project, and will also directly solicit bids from drilling contractors with the technical capabilities to drill and construct the proposed wells. ACWD has considerable experience with this task with six phases of similar type of monitoring well construction projects.

1.3) Permitting Process

ACWD has installed and is presently maintaining groundwater monitoring wells in Alameda County Flood Control District easements and obtaining encroachment permits is a straightforward process. ACWD has also developed a working relationship with the U.S. Fish and Wildlife Service through the South Bay Salt Pond Restoration Project. The U.S. Fish and Wildlife Service have already been contacted regarding this project and have indicated a willingness to issue a Special Use Permit. ACWD administers the Well Ordinance program and will be able to internally coordinate the required well drilling permits and inspection activities.

Task 2: Drilling, Well Construction, and Development

The wells will be drilled and constructed by a drilling contractor licensed in the State of California with a valid C-57 license. The boreholes will be drilled using a mud rotary drilling rig. All boreholes will be drilled with a diameter of at least 6-inches to comply with ACWD's guideline requirement for a 2-inch minimum annular seal around each well. During drilling, samples will be collected and materials will be classified by ACWD's Registered Geologist following the Manual Soil Description Standard (ASTM D2488-00) and the Unified Soils Classification System.

During construction, ACWD will comply with all local and federal environmental regulations. ACWD will use best management practices criteria as outlined in ACWD's Best Management Practices Guidelines for construction operations and comply with all storm water runoff requirements of the Alameda County Flood Control District and the Regional Water Quality Control Board. ACWD will also comply with any local jurisdictional requirements relating to noise abatement or construction hours; however, these restrictions are unlikely given the location of the drilling sites.

Geophysical tests will be performed in each of the deep exploratory borings. The testing will include: caliper, resistivity, spontaneous potential, conductivity, gamma, and temperature logs. ACWD will evaluate the geophysical log and lithologic log to determine the screening interval and proper design for each well.

All the wells will be completed as 2-inch diameter monitoring wells constructed with schedule 80 PVC casing with 20 feet of well screen (pending evaluation of the detailed well logs). All wells

will be constructed (i.e., the type of materials used and the interval of installation of the gravel pack, sand spacer, and seal) in accordance with ACWD Monitoring Guidelines and California Well Standards. Generally, the screened interval is gravel or sand packed 5 feet above the screen. A sand spacer of approximately 5 feet of fine sand is typically placed on top of the gravel pack. An annular seal of neat cement grout or sand-cement slurry is then placed from the top of the sand spacer to the surface.

The monitoring wells will be initially developed using a surge block and compressed air on the drill rig. The drilling team will be followed by a well development team responsible for final well development. The wells will be developed using a surge block/airlift method. Debris in the bottom of the well will be bailed out. A well development log will be kept to document well development activities and will include volume purged, general aquifer parameters (temperature, conductivity, and pH), and note water clarity.

Once the well construction and development is complete, a traffic rated utility box/stove pipe will be installed to protect the well from contamination or vandalism. Each well will be engraved with the well identification and state reference number. Drilling fluids and cuttings will be properly disposed of upon well completion. Specific well construction and development tasks are summarized below:

- Drill 800 foot exploratory borings in two locations.
- Collect soil samples and classify materials according to the Unified Soils Classification System.
- Collect ten samples for permeability testing.
- Conduct two geophysical logs.
- Review geophysical logs and lithologic log.
- Design wells.
- Construct 2-inch monitoring wells to a depth of approximately 500 feet in two deep exploratory boreholes.
- Drill three boreholes to approximately 150, 300, and 400 feet at two locations.
- Construct 2-inch monitoring wells in each borehole.
- Develop wells.
- Dispose of drilling fluids and cuttings.
- Install surface completion well box/stove pipe for each well.
- Clean up and restore drilling sites.

All field operations will be under the direct supervision of a Registered Geologist licensed in the State of California. The licensed professional will review all procedures and protocols outlined for the project and assure that Standard of Practice for the work proposed is followed and documented.

Upon completion of field operations, ACWD will record groundwater elevations from each well. The wells will be surveyed both vertically and horizontally using Global Positioning System technology. A well completion report will be completed and a copy will be included in the final report.

Task 3: Analytical Testing and Evaluation

Soil samples collected for permeability testing will be submitted to a soils laboratory certified by the American Association of State Highway and Transportation Officials. Falling Head - Flexible Wall permeability testing will be conducted on fine grained aquitard material by ASTM Method D-5084. Undisturbed soil samples for permeability testing will be collected in brass liners, sealed, and transported to the testing laboratory under chain of custody record. Permeability testing is needed to determine the potential for leakage between aquifers, a key parameter in understanding saltwater migration issues and inter-aquifer recharge.

General groundwater quality samples will be collected and analyzed for physical characteristics; chlorides (U.S. Environmental Protection Agency (EPA) Method 300), total dissolved solids (Standard Methods 2540C), and hardness (Standard Methods 2340B). The wells will be added to ACWD's Groundwater Monitoring Program, which monitors water quality parameters on a semiannual basis. The groundwater samples will be analyzed by a State of California Certified Laboratory that is in compliance with federal and state testing requirements in the Environmental Laboratory Accreditation Program. ACWD will require that the laboratory employs quality assurance measures.

All analytical data collected during this project will be reviewed by ACWD's Quality Assurance/Quality Control Officer following ACWD's Water Quality Laboratory Quality Assurance/Quality Control Manual.

Specific sampling tasks to be performed during groundwater sample collection are as follows:

- Record groundwater elevation prior to purging;
- Purge the well casing the appropriate volume per ACWD Groundwater Monitoring Guidelines;
- Collect the samples in laboratory supplied sample containers;
- Handle and preserve samples in accordance with EPA protocols; and
- Transport samples under chain of custody record to the laboratory.

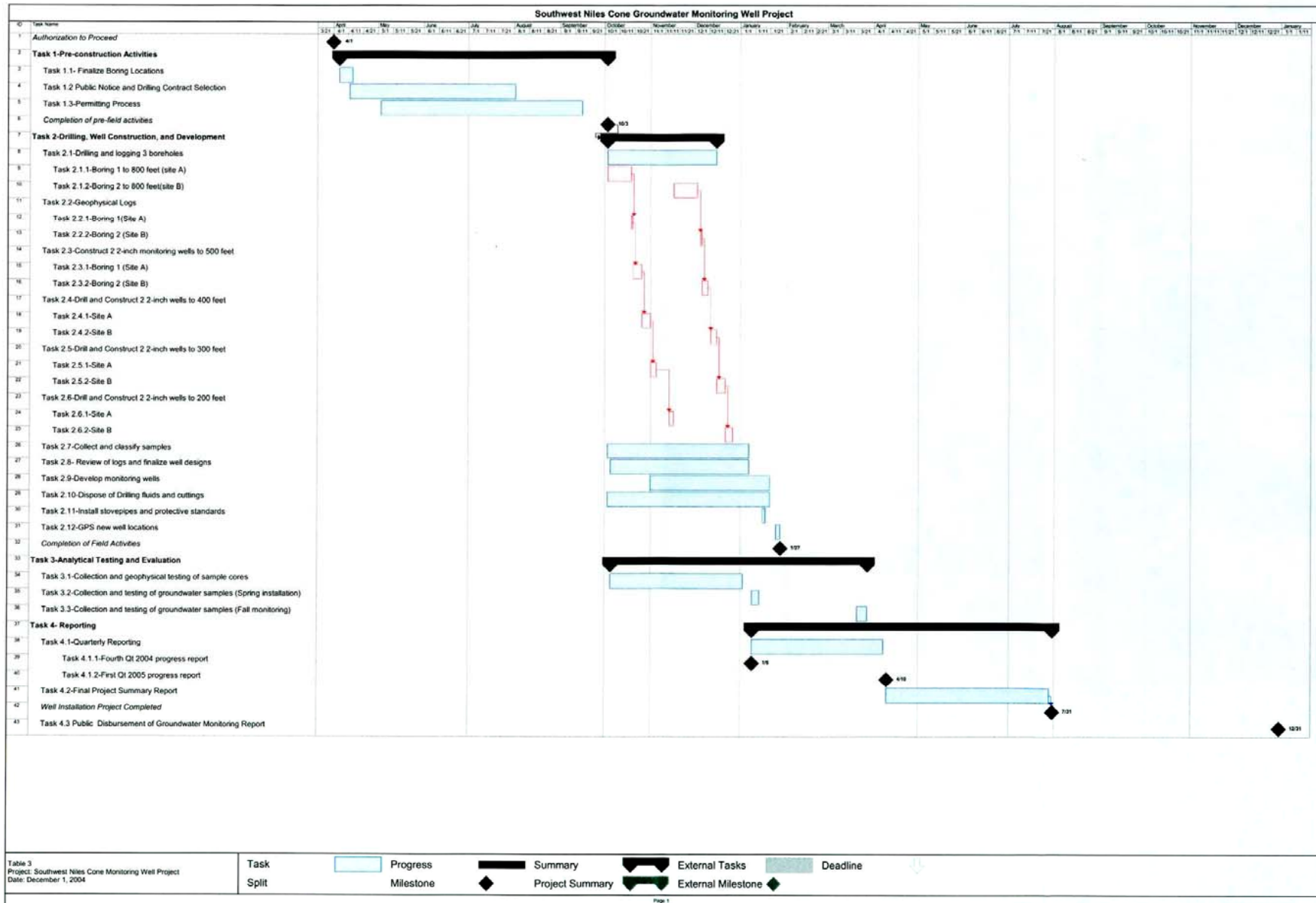
Task 4: Reporting

ACWD will submit quarterly reports to DWR which will include an executive summary, description of project operations to date, description of major accomplishments, discussion of any issues or concerns that may affect the schedule or budget, discussion of activities planned for the following quarter, cost and schedule information. The quarterly report format will follow the outline specified in Exhibit E of the grant agreement.

Upon completion of the project, ACWD will prepare a final report that will include all data, permits, field notes, well logs, development logs, chemical analyses, and permeability analyses. The final report will be a comprehensive document that will include a comparison of the planned schedule with the actual timeline, discussion of major problems encountered, a summary of all costs, and a detailed description and analysis of project results. The final report will contain all of the information specified in the grant agreement and will follow ACWD's quality control document procedures which requires the technical review of at least two senior staff, both registered professionals.

Water level and water quality information will be collected from the new monitoring wells during the spring and fall monitoring programs and will be used to construct water level and water quality contour figures that are included in the annual Groundwater Monitoring Reports. The reports will be sent to DWR and all interested parties that have requested to be placed on a mailing list.

2005 PROJECT SCHEDULE



2005 PROJECT BUDGET

(COSTS MAY VARY WITH YEAR AND LOCATION)

Table 2		ACWD Labor										Construction Expenses			Totals		
Detailed Budget:																	
Southwest Niles Cone Monitoring Wells Project		Groundwater Resources Manager		Hydrogeologist II		Well Ordinance Program Coordinator		Water Quality Scientist		Technician II		Quantity	Unit	Cost	Total Costs	ACWD Cost Share	DWR Grant Request
Hourly Rate		\$149		\$109		\$109		\$50		\$88							
		hours	est cost	hours	est cost	hours	est cost	hours	est cost	hours	est cost	per item	per item				
Task 1	Pre-Construction Activities																
	1.1) Finalize Well Locations	4	\$ 596	40	\$ 4,367			20	\$ 1,000							\$ 5,962	
	1.2) Public Notice and Drilling Contract or Selection	20	\$ 2,978	20	\$ 2,183											\$ 5,161	
	1.3) Permitting Process			10	\$ 1,092	80	\$ 8,734			40	\$ 3,503					\$ 13,329	
Task 2	Drilling, Well Construction, and Development																
	2.1) Drill and collect lithologic data for 2 boreholes to 800 ft.					20	\$ 2,183	10	\$ 500	250	\$ 21,895	2	\$ 37,996	\$ 75,992	\$ 75,992	\$ 24,578	\$ 75,992
	2.2) Geophysical Logs											2	\$ 1,500	\$ 3,000	\$ 3,000		\$ 3,000
	2.3) Drill 2 boreholes and install a 2-inch monitoring well to 500 feet							80	\$ 4,000	50	\$ 4,379	2	\$ 24,085	\$ 48,170	\$ 48,170	\$ 8,379	\$ 48,170
	2.4) Drill 2 boreholes and install one 2-inch monitoring well to 400 feet									10	\$ 876	2	\$ 19,068	\$ 38,136	\$ 38,136	\$ 876	\$ 38,136
	2.5) Drill 3 boreholes and install one 2-inch monitoring well to 300 feet									10	\$ 876	2	\$ 14,052	\$ 28,104	\$ 28,104	\$ 876	\$ 28,104
	2.6) Drill 2 boreholes and install one 2-inch monitoring well to 150 feet									10	\$ 876	2	\$ 6,525	\$ 13,050	\$ 13,050	\$ 876	\$ 13,050
	2.7) Collect and classify samples			150	\$ 16,376			20	\$ 1,000							\$ 17,376	
	2.8) Review of logs and finalize well design			20	\$ 2,183											\$ 2,183	
	2.9) Develop wells											8	\$ 1,000	\$ 8,000	\$ 8,000		\$ 8,000
	2.10) Dispose of drilling fluids and cuttings					10	\$ 1,092	10	\$ 500			8	\$ 3,500	\$ 28,000	\$ 28,000	\$ 1,592	\$ 28,000
	2.11) Install stove pipes and protective standards							4	\$ 200			8	\$ 500	\$ 4,000	\$ 4,000	\$ 200	\$ 4,000
	2.12) GPS new well locations									20	\$ 1,752					\$ 1,752	
Task 3	Analytical Testing and Evaluation																
	3.1) Collection and permeability testing of sample cores			4	\$ 437					20	\$ 1,752	10	\$ 290	\$ 2,899	\$ 2,899	\$ 2,188	\$ 2,899
	3.2) Collect and analyze groundwater samples upon well completion			4	\$ 437					20	\$ 1,752	8	\$ 37	\$ 296	\$ 296	\$ 2,188	\$ 296
	3.3) Collect and analyze groundwater samples during Fall Monitoring Program			4	\$ 437					20	\$ 1,752	8	\$ 37	\$ 296	\$ 296	\$ 2,188	\$ 296
Task 4	Reporting																
	4.1) Submit quarterly progress reports to DWR							40	\$ 2,000							\$ 2,000	
	4.2) Submit final project summary to DWR	6	\$ 893					40	\$ 2,000	8	\$ 701					\$ 3,594	
	4.3) Public Disbursement of Groundwater Monitoring Report							4	\$ 200							\$ 200	
Total Hours		30		252		110		228		458							
ACWD Labor Costs			\$ 4,467		\$ 27,511		\$ 12,009		\$ 11,400		\$ 40,112				\$ 95,498	\$ 95,498	
Construction Costs														\$ 249,943	\$ 249,943		
Total Costs															\$ 345,441	\$ 95,498	\$249,943